# ONTARIO
# FISH AND WILDLIFE
# REVIEW

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DEPARTMENT OF LANDS AND FORESTS

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# ONTARIO
# FISH AND WILDLIFE
# REVIEW

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CONTENTS PAGE



## THE COVER

The little lady in our cover photograph is holding a prize catch of landlocked salmon or ouananiche. See report on this species by J.F. Gage. Photo by T. Jenkins.

ONTARIO FISH AND WILDLIFE REVIEW is published four times per year by the Department of Lands and Forests, Parliament Buildings, Toronto 5, Ontario. 

# EDITORIAL

A new Game and Fish Act was proclaimed in Ontario this year. It is an elaborate piece of legislation and it will be supported by a great body of Orders in Council which, in total, constitute the regulations.

Is it necessary to have so much legal detail to govern recreational activity? Does the application of the law detract from the recreational value of hunting and fishing? These are questions that any sportsman can legitimately ask.

The body of law surrounding hunting and fishing is designed to do a number of things. Some items are purely administrative, to ensure that licences are purchased to provide revenue to operate the system, for instance. Some items attempt to distribute the fish and game resources as widely as possible among the interested public. Creel and bag limits have this purpose. Other items attempt to ensure a reasonable standard of sportsmanship. The regulations against jack lighting and spearing of fish are in this category. From the point of view of biology, it matters very little whether a pike is taken with a spear or on a spinner. It is removed from the population either way. But, from the point of view of sportsmanship, there is an immense difference.

An important part of this legislation is based on the biology of the animals, birds and fish concerned. Where it is apparent that a species is seriously reduced in numbers, and all the individuals are needed as breeding stock if it is to be restored, then a restricted take, or no take at all, may be indicated, as in the case with certain duck species this year. Where it is obvious that a species is so numerous that it is damaging its food supply by overuse, then regulations are set up to encourage people to take it. Seasons are lengthened and bag limits are increased. This applies to the moose population over much of Ontario at present, although it has not been desirable to increase the bag limit because, after all, who wants more than one moose?

Fluctuations in number of game and fish species are caused by a wide variety of natural causes, not all of them fully understood. Weather extremes, damage to the habitat by natural or man-made agencies, epidemics of disease organisms, and the presence of competing or predatory animals, birds or fish can cause great variations in numbers.

Any successful program of legislation directed toward game and fisheries management must be based on a knowledge of all these factors. For this reason, a large proportion of the work of the Fish and Wildlife officers of Ontario is devoted to the collection and interpretation of biological information. This information is translated into a management program by means of legislation.

How well this type of legislation serves its purpose will depend on the quantity and quality of the information available about the animals, birds and fish. Steadily rising numbers of hunters and fishermen are having a greater impact on game and fish stocks than ever before. The trend will continue. Thus, the accurate assessment of game and fish stocks is more important than it ever has been in the past.

This means that the position of the field officer is more than ever crucial to the management program for fish and game in Ontario. More is required of him each year. He has had to expand his skills and interests into fields of activity that were scarcely considered even a few years ago. He, like everyone else in our society, must meet the challenges of the age of innovation, and at the same time he cannot relax his traditional vigilance against law breakers. In this position of challenge and trust, he has a right to expect the support and encouragement of both the public and his colleagues.

# THE LANDLOCKED SALMON OR OUANANICHE IN ONTARIO

*by J.F. Gage*
*Biologist, North Bay Forest District*

A small body of water known as Fourmile Bay in Trout Lake at North Bay, Ontario, has for the past twenty-five years made a determined bid to place itself in the unique position of having "landlocked salmon" or "ouananiche" fishing. Of all the waters in Ontario where salmon have been introduced, only Trout Lake is known to contain a self-sustaining population. The original introduction was made in 1935. The stock came from Lake St. John and they were called ouananiche.

The landlocked salmon or ouananiche should not be confused with the term, salmon trout, often used in reference to some forms of lake trout. The ouananiche *(Salmo salar ouananiche)* is a true salmon, a freshwater variety of the Atlantic salmon *(Salmo salar salar)*, the king of fishes.

The Atlantic salmon was well known in Ontario in early times. Lake Ontario supported an excellent population. The salmon fishery on some of the streams feeding Lake Ontario played an important role in the lives of the early pioneers. The following advertisement appeared in the Gazette of York, May 16, 1798: "To be sold at John McDougall's Hotel in the Town of York, a valuable farm situated on Yonge Street, about twelve miles from York on which is a log house and seven or eight acres well improved. It affords an excellent salmon fishery, large enough to support several families" (MacKay, 1960).

It is generally believed that these fish did not go to sea but remained in Lake Ontario. The last recorded observation was made by A.W. McLeod in 1893 on Wilmot Creek, near Newcastle, when he secured some 4,000 eggs for the Dominion Government Fish Hatchery located there. More recently, attempts were made (McCrimmon, 1946) to reestablish the Atlantic salmon in Lake Ontario by planting fingerling stock in such waters as the Rouge River and Wilmot and Duffin Creeks. Substantial numbers of parr were observed later in the stream, and some smolt were recorded leaving the streams on their way to Lake Ontario. However, the adult fish did not make their appearance as hoped for and only the odd specimen was observed in later years.

Considerable effort has been expended in attempts to introduce and reintroduce the Atlantic salmon and its landlocked form, the ouananiche, to various Ontario waters, as stocking records can testify.

In 1948, thirteen years after the initial introduction to Trout Lake, sufficient numbers of salmon were evident to attempt a spawn collection. Consequently, some thirty-five adults were captured and held at the North Bay Provincial Trout Hatchery for spawn taking. From this effort, some 800 fingerlings were finally reared and released back into Trout Lake and 400 fingerlings in Herridge Lake in 1949. The thirty-five adult fish were released in Martin Lake in hopes that they would eventually establish a new population. These attempts failed in both Herridge and Martin Lakes as did a further stocking of 1,500 yearlings in 1950 in Martin Lake. A few of the original adults stocked in Martin Lake were taken by anglers in the years following the introduction.

*Conservation Officer Aurel Landriault holds a typical ouananiche taken on a streamer fly in Fourmile Bay, Trout Lake. Weight: 6½ pounds. Staff photo.*

Dr. H. McCrimmon and the writer directed the stocking of 6,800 yearling salmon (marked by removal of the adipose fin) into suitable sections of Fourmile Creek in 1952. These fish are now twelve years of age. Although none has been reported by anglers, some individuals may still be present in the lake. It is not likely that anglers would notice the missing fin unless

their attention was directed specifically to the marking. It is a sad, but true, fact that there is no evidence of the establishment of a self-sustaining population from any plantings except the ones in Trout Lake. Even here, there is no evidence that additional hatchery plantings have contributed in any way to the established population.

It should be noted that in 1946 or 1947 some Atlantic salmon fingerlings were stocked in Trout Lake. These fish were not the ouananiche or landlocked salmon which were originally stocked in 1935. If there is a difference in these two forms, be it only in behaviour, there may be two forms currently existing in Trout Lake.

The North Bay Trout Hatchery had difficulty with its initial attempt to rear salmon. Therefore, in 1950, some 60,000 eggs were collected and distributed to five different hatcheries throughout the Province. Only Dorion Hatchery, near Port Arthur, had good results, producing a near normal growth rate but, even here, there was some difficulty in getting the young fish to feed properly. It is from this stocking that a second generation of hatchery-reared salmon is now being developed. There are still difficulties, however, in rearing this species successfully. In many hatcheries, the water is much too cold to permit normal growth in young salmon, in spite of the fact that both brook and lake trout can be reared successfully.

## LIFE HISTORY

The Atlantic salmon is an anadromous fish; that is, it lives in salt water and returns to fresh water to spawn. The landlocked form lives in the larger lakes and returns to the streams each fall to spawn. Unlike the various species of Pacific salmon, the landlocked and Atlantic salmons do not always die after spawning but may return each year to spawn.

In Trout Lake, spawning usually takes place about mid-November. The salmon ascending the stream undergo changes, particularly the males which develop a great curved hook in the lower jaw. The colour changes. The males lose their silver sheen and take on a darker appearance and, while the lower sides becomes a yellow ochre shade, the black shaped spots turn a soft, chocolate brown. The females lose some of their silvery appearance but retain sufficient to distinguish them from the males, and the jaws retain their normal conformation.

The fish appear to be most active during the early hours of darkness. Although some fish have been observed on Fourmile Creek during the daytime, they usually retire to the seclusion of the undercut banks and log jams. The redds or spawning beds are prepared in the usual salmon fashion. A large patch of gravel is fanned and cleaned by the parent fish. The eggs and milt are deposited over the gravel by the parents and are almost immediately covered by additional deposits of gravel worked up from the bottom by their tails and bodies. From time to time, more gravel is loosened from the bottom and permitted to travel with the current, increasing the size and depth of the redd. The redds may be used by other salmon after being vacated by previous pairs. Most of the redds observed on Fourmile Creek were in water less than twelve inches deep.

The eggs, which are quite large, remain in the gravel redds throughout most of the winter and may hatch anywhere from the end of January to March, depending on water temperatures. The young fry remain in the stream, seeking out the cooler sections during the hot summer and often travelling some distance upstream. As the fry develop, they assume a trout-like character com-

plete with large dark bands or parr marks and bright red spots. They are now called "par." The parr remain in the stream for two years, descending in the spring as "smolts" when the parr marks fade and are replaced by the typical, silvery colouration of the adult fish. At this time, the salmon have reached a length of about five inches.

The next year, spent in the lake, is one of great change. Their growth rate phenomenal. From an examination of the scales, it was found that at three years of age these fish may reach anywhere from fifteen to twenty inches in length.

The determination of age through scale examination is particularly difficult in salmon. Blair (1937) states that, in about 67 per cent of the cases, the ages cannot be determined correctly from the scales, the fish being anywhere from one to four years older than indicated. He further states, however, that the scales of young salmon under three years are fairly easy to read and that it is after the first spawning that the scales are unreliable for age determination. Whitfield (1948, unpublished) states that none of the 64 fish taken by impounding gear in Trout Lake had spawned before age five, and only a portion of the five-year-olds were mature.

*The Champlain Fly on top with two other versions used with success in ouananiche fishing. Photo by J.F. Gage.*

## PRESENT STATUS

The landlocked salmon has provided some excellent sport in Trout Lake, and particularly in the Fourmile Bay area in recent years.

Angling is best soon after the ice leaves in late April or the beginning of May. The season opens officially along with the brook trout season, usually around the first of May. From then until the middle of June, these fish can be taken by angling. After the warm weather arrives, they do not hit so well, and some salmon are taken by lake trout fishermen in deeper waters.

The usual method of angling, and the most sporting, is by trolling a streamer fly behind an outboard motor boat. The fly is worked on a reasonably short line in the surface turbulence created by the motor moving at a moderate speed of about five miles per hour. A good leader, of not less than five pounds test, is recommended. The streamer fly is usually of the tandem type. Any good pattern which represents a shiner minnow or smelt will work well, although some highly coloured patterns account for some excellent fish. One of these, called the Champlain, is an excellent fly. It is used and recommended by Mr. Len Hughes, of North Bay, to whom is due most of the credit for the development of the sport fishery for the salmon in Trout Lake.

While the Champlain fly can be purchased from sporting goods stores, some anglers might like to try their hand at making their own. The pattern is as follows:

Champlain Tandem Streamer Fly Pattern
Hook size #4, T. D. E. long shank

*Lead Fly* – yellow silk, silver ribbed. Be sure to tie in piece of monofilament leader to attach trailer fly.
Tail – none.
Wing – streamer type white polar bear or deer tail in three colours, white, yellow and blue, plus six strands of peacock herl.
Saddle or Cheek – trimmed partridge.
Throat Hackle – short, soft down, dyed red goose.
Fly Head – wound or whipped back for 3/8 inch coated with black lacquer, plus white and orange eye spot.

*Trailer Fly* – #4 hook T. D. E. regular shank.
Body – yellow silk, silver ribbed.
Tail – polar bear.
Wing – streamer type, white polar or buck tail.
Hackle – white polar bear.
Over-all length of fly approximately 4¼".

Sinkers are not required although a single split shot would not be amiss if the fly is bulky and inclined to float high. A good fly rod with a stiff action will provide the ultimate pleasure in taking this fish, although spinning tackle has become more popular in recent years. The shorter rod, slip clutch and large line capacity reels, give the spinning tackle enthusiast a distinct advantage in bringing this fish to net.

When a fish takes the fly, it will strike swiftly and hard. It is in these first few crucial moments that most good fish are lost. The fish is almost certain to break the surface as the hook is set. True to his latin name, *salar* "the leaper", the fish will put on a spectacular display of aerial acrobatics.

The salmon in Trout Lake measure from fifteen to thirty inches. The average fish weighs around four pounds with some fine specimens up to nine pounds. A few fish observed on spawning runs were estimated nearer to ten pounds in weight.

There is another period, in the early fall, when the fishing is good. As the surface of the water begins to cool, fish can again be seen jumping in various sections of the lake, particularly near the outlets of smaller streams or creeks.

Recently, anglers have resorted to the old-fashioned method of still fishing with a bobber for salmon. Anchoring their boats in the shallow waters off shore, close to the drop-off to deeper water, anglers attach small shiner minnows to a short length of line held suspended in the clear water by a float or bobber. Fish moving up from the cooler depths in the evening or early morning seem to be particularly vulnerable to this technique.

In one respect, fishing for salmon in Trout Lake can be compared to fishing for maskinonge. It may be a long time between strikes but the results more than compensate for the effort expended. Most anglers feel that, if they land one fish for every two or three hooked, they are doing well. Under these circumstances, the creel limit of one salmon per day is quite reasonable. A few anglers release all the salmon they catch as a gesture of respect for the high quality of the sport provided by this fish – truly the king of the freshwater fishes.

## PRESENT AND FUTURE STUDY PLANS

One of the main objectives in the management of this species in Trout Lake is to produce sufficient numbers of salmon to provide better angling opportunities for more anglers. Current plans for this fish are aimed at dis-

covery of the factors limiting the present population. A study was begun in 1962 to assess the annual increment to the lake population by counting the number of smolt descending the only major stream, Fourmile Creek. In 1958, the writer captured a yearling salmon in this stream some three-quarters of a mile from the lake and, later that same fall, observed adult salmon spawning the stream, confirming the fact that the salmon actually used the stream for spawning. (Earlier reports of spawning in Fourmile Creek have not been confirmed.) The spawning run was again observed in November, 1962, when twenty to twenty-five fish were seen preparing redds in the gravel and spawning.

A downstream trap was designed and installed in the stream in July, 1962, to catch the descending smolt. Since most smolt descend in the early spring, a large catch was not anticipated. Some fifty parr and smolt were captured, however, and marked for future identification before being released. It is believed that these were not true migrations but only a part of the normal movement of young salmon in the stream. Most of the individuals were young parr not yet in possession of the silver coat which identifies the descending smolt.

It is expected that the study will run at least another two years. To further supplement information on growth and movement, several thousand hatchery-reared yearlings will be released in the stream and their numbers noted as they pass through the traps on their way to the lake. These fish will be marked for future identification. Biologists believe that it is necessary to establish and maintain a good stream-spawning population to provide good fishing.

Eyed eggs of salmon were set out in several streams flowing into Talon Lake in the Trout Lake – Mattawa River watershed in 1962 in an attempt to produce a population of salmon in that lake.

In addition to assessment of spawning success, a survey of the physical aspects of Trout Lake is planned to be carried out over the next two years. Chemical analysis, temperatures, oxygen determinations and other important data will be collected. The salmon population in Trout Lake has maintained itself since 1935. There must be other waters in Ontario suitable to the species. Therefore, the adult salmon will also come in for closer scrutiny to determine their food habits, growth rates, movements, temperature preferences, oxygen requirements and general behaviour patterns. This information will form the basis of knowledge necessary to extend the range of this fine game fish to other waters in the Province of Ontario.

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# MICHIPICOTEN ISLAND BEAVER TRAPPING

*by E.A. Pozzo[1] and A.B. Stephenson[2]*

Michipicoten Island is located in Lake Superior nine miles from the mainland and 45 miles west of Michipicoten Harbour in the White River Forest District. The island is elliptical in shape with its long axis lying in an east-west direction. It is approximately 16½ miles long and six miles wide and covers an area of 70.85 square miles.

The terrain is relatively low on the south side but rises gradually to a rolling topography in the central and northern portions of the island. The highest elevation is 937 feet above the lake level. Rock faults are conspicuous on several of the hills and along the north shore where there are precipitous cliffs. Beach ridges are present on the south and west sides of the island; six terraces have been described, the highest of which is at 295 feet (Coleman, 1898).

Several factors combine to provide conditions on Michipicoten Island which are favourable to some species of wildlife. Unlike the rather unproductive soils of the northern mainland, the soils of Michipicoten Island are derived from more fertile, and more easily weathered, sedimentary and volcanic rocks. Combined with the moist climate and heavy but unmeasured precipitation, the basic fertility of Michipicoten Island is expressed in an abundance of luxuriant vegetation. Burwash (1905) stated that the undergrowth was so dense it prohibited summer travel off the trails. Passmore (1950) also remarked that the thick growth of ground hemlock and mountain maple on the drier sites, and the tag alder on the marsh sites, prevented extensive travel. The heavy forest growth is made up primarily of mixed woods and northern hardwoods, with lesser amounts of conifers found on low areas and north-facing slopes. Several tree and shrub species important to beaver are present in moderate abundance.

Because the ice in the channel separating Michipicoten Island from the mainland rarely forms a complete bridge, and then only for a short period, there are relatively few species of animals present on the island. Among the game fish, only the brook, rainbow and lake trout are present (Pozzo, 1961). The ruffed grouse has been reported, although it is not common (Passmore, 1950). Among the mammals, snowshoe hares are abundant while muskrats, weasels and foxes are common. There were no deer on the island in 1950 but a few are now present as a result of a recent introduction. Beaver have been abundant for, at least, the past 40 years, utilizing the excellent habitat provided by the many small lakes and ponds and their interconnecting streams.

Human habitation on Michipicoten Island has been intermittent, often seasonal and has exerted very little pressure on the wildlife species there. The first development took place in 1853 when Quebec Mine (near the northwest corner of the island) was opened to remove deposits of copper and some nickel and silver. In 1863, it became known as Fletcher's Mine and continued to operate on a small scale into the 1880's. There may have been permanent residents on the island at that time for Coleman (1898) refers to a farm which was located on the upper beach terrace near Quebec Mine.

[1]*Senior Conservation Officer, White River.*
[2]*Biologist, Research Branch, Maple.*

*Indian tent camp at Channel Lake, Michipicoten Island. Staff photo.*

Commercial fishing vessels started to operate in the vicinity of Michipicoten Island in 1875 and undoubtedly used Quebec Harbour as a base (Whitcher, 1876). Eventually, a small village developed on the north shore of this bay which has remained a seasonal fishing base to this day. Apparently, there has been an occasional individual who remained on the island throughout the year but not for any extended period of time (Passmore, 1950).

As shipping on Lake Superior increased, a lighthouse was established in 1912 on the eastern end of the island which was and still is inhabited seasonally by lighthouse keepers.

During the late 1920's and 1930's when beaver were scarce on the mainland, poachers visited the island frequently in quest of the beaver. Evidence of these early trapping activities can still be seen in the form of abandoned cabins and shelters and old traps and snowshoes hanging in trees. Several residents, still living in mainland communities, are personally familiar with this "poacher's haven".

At the present time, there are no permanent residents on the island. A few commercial fishermen and lighthouse keepers live there from spring until early December and, during the summer, a few tourists visit the area. Trappers are, however, the only human inhabitants during the winter.

The first legal trapping began in 1956 when the lighthouse keeper was licensed to trap beaver. He trapped for only short periods during the fall but managed to take a total of 122 beaver during the next four years. In 1959, aerial and ground inspection by Departmental personnel indicated that beaver

*Wire snares are made and fastened to the poles. Photo by G.S. Brown.*

were still very plentiful and that special efforts should be initiated to utilize this resource.

In the spring of 1960, two Indian trappers from Moose Factory were asked if they would be interested in harvesting the beaver on the island. When told of the number of beaver existing there, they readily agreed to trap the island during the 1960-61 season. Through the co-operation of the Department of Lands and Forests and the Federal Indian Affairs Branch, these two trappers and their families were placed on the island on October 7, 1960. On flying over the island, the trappers were amazed at the number of beaver lodges and dams they observed. They remarked that they had never seen anything like it before.

They set up a tent camp on Channel Lake and were supplied with a two-way radio so that they could communicate with White River in case of emergency and to arrange for supplies and fur pickups. They remained in their tent camp until spring when they moved to Quebec Harbour where they occupied two cabins for the rest of the season.

The Indian families depended a great deal on the island for their supplies and food. The resources of the island were used in making snowshoes and toboggans. Beaver, rabbits and the occasional fish comprised their main diet. The beaver were often barbecued by hanging them from a tripod close to the fire and turning them repeatedly for several hours. Bannock was made from flour and water, with raisins or currants added to make a flat cake.

The men did most of the trapping. They would leave their families at the main camp for a week or so at a time and, on returning with their catch, would

*Beaver pelts on hoops or frames, showing relative sizes. Photo by G.S. Brown.*

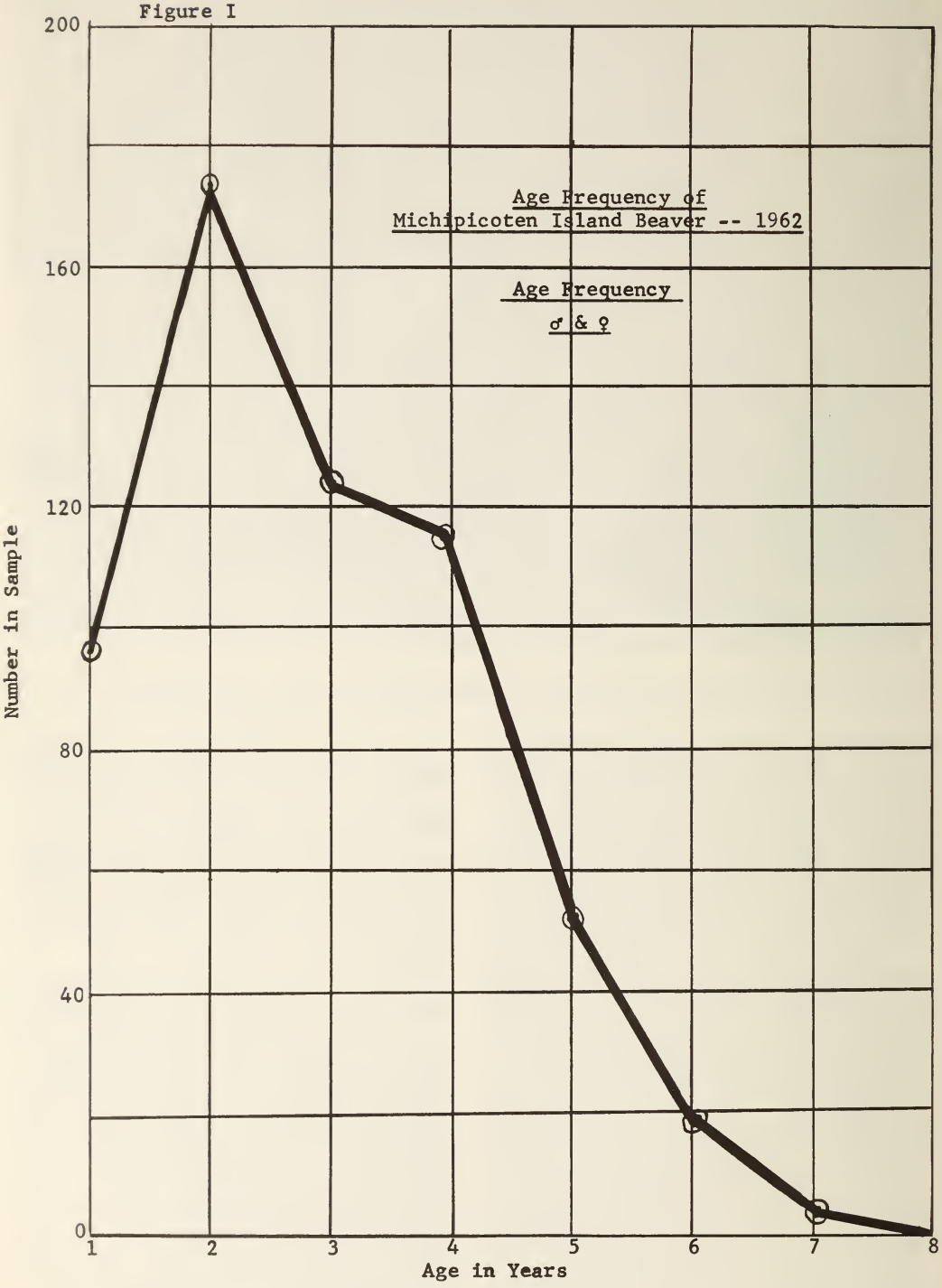
spend a few days helping the women to skin, stretch and dress the pelts. They had three dogs which they used in transporting beaver carcasses back to their camp. All beaver skins were hoop-stretched on home-made willow frames and frost-dried when weather permitted.

Steel traps were used for open-water trapping in the fall. During the winter, snares were used as these were more effective and lighter to carry; a trapper could carry 50 to 75 snares in his pockets. The snare set was made by attaching three or more snares to one or two dry poles, placed so that the snares covered the runways leading to the beaver lodges. No bait was used in this set. As many as three or four beaver, depending on the number of snares used, could be captured in this way by the time the trapper checked his set again.

The two Indian families took 1,176 beaver during the 1960-61 season. An additional 122 beaver were taken by the non-Indian trapper. The Indians spent approximately 200 days actually trapping; thus, they averaged 5.9 beaver per day and caught 18.3 beaver per square mile.

The pelts were flown to Wawa and then taken to White River where they were sealed, packed and forwarded to the fur sales. The average price received was $11.91 per pelt. A much higher price would have been paid if the majority of the pelts had not been scarred. This scarring was evidence of a high beaver population which led to excessive fighting among the animals. Fur buyers were reluctant to bid high on these scarred pelts due to the possibility that holes would appear during the tanning process. Nevertheless, the

Figure I


Age Frequency of
Michipicoten Island Beaver -- 1962
Age Frequency
♂ & ♀
Number in Sample
200
160
120
80
40
0
1
2
3
4
5
6
7
8
Age in Years

*Hauling beaver pelts to aircraft at Quebec Harbour. Photo by G.S. Brown.*

trappers had a very successful and rewarding season.

In the spring, the Indians reported that the high take of beaver had not drastically altered the population, as beaver seemed as plentiful in the spring as they had in the previous fall. An aerial survey in the fall of 1961 confirmed that beaver were still numerous; a total of 730 active lodges was recorded. One family of beaver had even set up house in the hull of an abandoned and partly sunken fishing tug in Quebec Harbour.

For the 1961-62 season, it was decided that a third Indian family would be permitted to trap. By November 5, 1961, the three Indian families had set up their tent camp at Michi Lake on the west end of the island. When trapping terminated at the end of March, 1962, they had taken 1,552 beaver. They averaged 6.2 beaver per day with a maximum for any one day of 27 animals. In addition, the non-Indian trapper took 127 animals, giving a total of 1,679 beaver for the 1961-62 season. This represents 23.7 beaver trapped per square mile.

The number of beaver lodges reported trapped represented 43 per cent of the 730 available lodges; thus, the trappers took an average of 5.3 beaver from each lodge trapped. It was determined by intensive trapping of three lodges in October, 1961, that there was an average of eight beaver per lodge, which approximated an earlier estimate by one of the Indians based on his 1960-61 trapping experience. From these limited data, it was estimated that there were 5,800 beaver on the island in the fall of 1961 and that 29 per cent were removed during the 1961-62 trapping season.

The Indian trappers also collected information on the sex, weight and pelt size of a sample of beaver. Skulls from 589 animals were examined by biologists.

They revealed a preponderance of males in the catch to the extent of 117 males to 100 females. Yearling beaver were taken more frequently than any other age group but, in general, there was a selection for larger and consequently older animals, as shown in Fig. 1.

In the younger age classes, male beaver were consistently heavier than females but, as they approached their mature size at four years of age, there was little or no size difference between the sexes. The average weight for kits was 13½ pounds; yearlings, 26 pounds; three-year-olds, 36 pounds; and four-year-olds, 39½ pounds.

The size of beaver pelts is an important factor determining their value on the fur market as well as indicating the composition of the beaver population. Pelts with a combined width and length measurement of 60 inches or greater are from potential breeding animals over two years of age. In the 1961-62 catch, 54 per cent were in this group. This is a higher percentage than in some areas under continuous annual harvest. Thus, the beaver population was in a good, productive state despite the high numbers removed during the previous two seasons.

Early in November, 1962, a second aerial survey indicated that there were 641 active lodges on the island — a reduction of 12 per cent from the 1961 figure. However, subsequent information on the number and location of lodges trapped indicated that this figure was low by 10 to 15 per cent. There was probably little change in the number of active lodges between 1961 and 1962.

The three Indian families and the non-Indian trapped the island again during the 1962-63 season. They took a total of 1,166 beaver which is a reduction of 31 per cent from the previous season. The Indian trappers took only 1,012 beaver while the non-Indian increased his catch to 154. The number of lodges trapped increased from 316 to 460 while the number of beaver taken per lodge decreased from 5.3 to 2.5. This reduction in catch, despite an increase in the number of lodges trapped, need not imply that the beaver population has declined. The actual time spent trapping by the Indians was less in 1962-63. Also, the age composition of the catch was unaltered. The potential breeding segment of the population, based on a sample of 200 beaver, remained at 54 per cent. This implies that there has been no appreciable change in the productive state of the population.

Investigations will continue in an effort to maintain this high production by regulating the harvest according to the long-term carrying capacity of Michipicoten's excellent beaver habitat.

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# SOME SCUBA OBSERVATIONS FOR THE FRESH WATER ANGLER

*by D.R. Hughson and J.M. Sheppard*
*Conservation Officers, Sudbury Forest District*

The use of scuba (self contained underwater breathing apparatus) diving techniques during the past two years has made a wealth of new information available to fisheries technicians. This new approach has now been incorporated into the lake survey program of the Sudbury Forest District.

Diving has provided a quick and accurate method for determining the type and contour of the bottom. Mud, silt, rock, springs, ledges, shoals, etc., can be located accurately and studied. It is possible to study firsthand the fish and their behaviour in their social and physical environment.

Most of our work has been confined to the upper 50 feet, but depths of slightly over 100 feet have been investigated. Local sportsmen assisted in certain phases of the work, particularly during observations concerning the reaction of fish to artificial lures.

In some waters, currents ran more than ten miles an hour, requiring weights in excess of 50 pounds and the exercise of a good deal of caution.

Temperature seldom limited the effectiveness of this technique. With a combination of wet and dry suits, it was possible to operate under the ice for extended periods without extreme discomfort. Water temperatures above 55°F were best since they permitted wearing a single suit (or portion of it) giving greater freedom of movement.

Light and light penetration are important limiting factors. The period between mid-May and mid-September appears to be the best for underwater visibility in the Sudbury area, as the suns rays are at their best angle, in relation to the water surface, for maximum light penetration and minimum distortion. Bright days are preferred.

The colour of the water greatly affects underwater observations. The dark water of the French River restricts visibility as compared to the clear water of Lake Huron or Nameless Lake in Gordon Township, District of Manitoulin. Restrictive visibility requires that more time be spent in examining a given area and, as a result, larger quantities of breathing air are used.

Walleye (yellow pickerel) showed little fear of the observers, and only when sudden movements were made did they exhibit any pronounced escape reactions. They could be approached to within a distance of from four to six feet before they darted off, turned to face the source of escape stimulus and waited until approached again.

Particular attention was given to a school of walleye located in late June and kept under intermittent observation for 65 days. They remained in a single school during the entire period. At no time during the 15 observations were these fish found to be more than 150 feet from the original location.

About 45 walleye, ranging from ¾ to 4½ pounds, made up this school. They maintained themselves at a level of about two feet from the bottom throughout the season, gradually moving from the shallows of four feet to the deeper water of eighteen feet. The diameter of the school was about 20 feet throughout the observation period. It is our opinion that the migration of the fish from shallow water into deeper water was thermally induced. The fish

*Two divers prepare to enter the water. Photo by D.R. Hughson.*

appeared to prefer a temperature stratum which they sought and followed as the water warmed with the progression of the season. As they moved into deeper water, they maintained a level that kept them within reach of the moderate bottom cover of coontail and green algae.

Anglers were informed of the location of this school of fish. On several evenings, as many as seven boats fished right over the school but only one fish of about two pounds was taken. Eventually, the fishermen became discouraged and discontinued their attempts to catch fish from this school. The inability of anglers to catch walleye at this time of year was not general for the area. Approximately one mile down stream in a portion of the river about the same depth as the bay, but in swifter current, a few walleye were taken daily.

The bay, where the walleye were observed, supported a population of common shiners, spottail shiners and lake chub. These species were never seen mingling with the school of walleye. The bottom, a sand-silt mixture, supported a few crayfish and snails.

Smallmouth bass and sunfish were taken by the authors angling, while submerged, with two feet of line and a worm-baited hook. These fish, taken under a floating dock, showed almost no fear of the swimmers.

While two fishermen fished with worms, a school of rock bass was observed. The fish moved as a group towards the bait but at a very slow speed until they were approximately six feet from it. At this point, one fish broke from the school and struck at the baited hook. This created considerable excitement among the fish and as a group they darted back and forth around the hooked fish which regurgitated part of two minnows and some larvae which the other fish quickly ate.

None of the species previously mentioned (walleye, sunfish, smallmouth bass and rock bass) appear to be as wary as the northern pike. This species was usually found singly and never with more than two in a group in larger bodies of water. Most of the pike seen were found in areas near dense weed beds which provided cover and a source of food species. Attempts to catch pike, in a manner similar to that used for smallmouth bass and sunfish, proved unsuccessful. Pike showed a far larger range of flight. A marked tendency to return to the original location after flight was noticed.

A series of observations was made on lake trout in Kukagami Lake in connection with a contemplated closure to winter fishing. Kakagami is a typical oligotrophic (deep and relatively unproductive) lake with many shoals and deep holes. Large areas of the lake were examined during the summer months with particular attention being paid to the shoals during the fall season.

Observations were made in waters to a depth of 100 feet where the visibility was remarkably good. The bottom of this lake at 100 feet is usually black silt, at least a full arm's length in depth. When contacted, this material appeared to tremble and shift like a mass of jelly. Vegetation at this depth appeared to be limited to scattered masses of algae. In some areas, large boulders rose above the bottom, each with its layer of silt covering its top.

In the rock shoal areas, many hundreds of yards of monel line, running in every direction, bespoke many frustrated anglers.

In Kukagami Lake, trout are reported to spawn on or about October 24. Three checks were made on the rock shoals (October 20, October 31 and November 9). The trout seen on these visits showed little fear and could be approached within eight feet. The

shoals examined were reported by local guides and camp operators to have been good spawning grounds ten years ago when large numbers of fish could be seen during daylight hours as well as at night. Little indication of any spawning activity was observed during any of our visits.

In brook trout lakes, observations indicated that these fish move along the shoreline in spring. However, with the progression of the season and the warming of the lake's waters, one school of fish could always be located at a cold spring which entered the lake near a beaver house. The trout stayed in among the sticks of the lodge and could be approached within five feet before they dispersed, only to regroup in a few moments in the cold spring water.

Twenty to thirty suckers were found swimming among the brook trout. The suckers ranged in size from 5 to 15 inches. In October, three pairs of brook trout were observed clearing areas approximately three feet in diameter in the vicinity of the spring. No eggs were seen in the beds.

The most impressive fish were the sturgeon. These are usually seen in fast-moving water; they ranged in size from an estimated 30 to 200 pounds. They showed no fear of the diver until touched, and then they moved only a short distance.

On some occasions, several species were found in a group. For example, below a dam in a slight current, 15 walleye, five lake trout, three smallmouth bass, one largemouth bass and approximately 200 suckers were found together. Three of this group were carrying small plugs and spoons hooked in their jaws; they did not appear to be inconvenienced in any way by the lures in their mouths.

With the assistance of two local,

*Returning from dive below Recollect Falls, French River. Photo by D.R. Hughson.*

*Underwater investigations are carried out in winter as well as summer. Working below ice is rewarding but requires extra precautions. Photo by D.R. Hughson.*

sport fishermen, attempts were made to interpret the appearance of artificial lures as the fish might view them. Most of the wooden diving baits, on a fast retrieve, appeared as small dark objects followed by a small row of bubbles. It was only on the slower retrieves that their shapes could be determined and their best action shown. In the darker waters, where light penetration was poor, yellow, gold and silver were the colours most readily distinguished. It was observed that lures could be dragged very close to fish without any apparent response.

It appears that only a small percentage of a lake area is populated with fish at any specific time. The fish appear to have a clumped rather than a uniform distribution within a lake. Most fish species tend to school and are seldom seen singly, northern pike and maskinonge being the exceptions. It is quite possible to find more than one species of fish in one group, moving about as a unit.

These results from scuba diving have given some indication of what can be done with this new technique in the study of lakes and their fish populations. It is anticipated that, in the future, in order to provide more complete data, a single species or a single lake will be given particular and undivided attention. Many other facets of fish behaviour, survival, reproduction, etcetera may be studied by means of this technique.

Scuba diving can be a most informative and interesting pursuit for the aquatic naturalist. However, it should be pointed out to anyone contemplating the use of scuba that a thorough understanding of the equipment is necessary before it can be used with safety.

# WOLF CONTROL AND MANAGEMENT IN ONTARIO*

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*Photos by the Author*

Predator control has been one of the greatest bones of contention between North American sportsmen and game managers during the past 25 or 30 years. This is the period in which the the science of game management has passed through a most dynamic evolution, a period during which wildlife research has made many exciting discoveries and has laid open to question many of the old dogmas. At the beginning of the period, virtually all funds that were spent on wildlife conservation were directed toward law enforcement and the control of predators. Gradually, there has been a change of emphasis. More and more personnel, whose sole job once was law enforcement, are being trained to participate in the many-sided approaches of fish and wildlife management programs.

In the control of predators, the cherished bounty system is being discontinued in more and more areas and it is being replaced by predator control programs of many hues and colours. In many cases, wildlife managers have made a very serious error. They set their sights on the bounty system and have been so intent on getting rid of this "evil" that they forgot about the future. They seemed to have believed that, once the bounty system was eliminated, a utopian state would be achieved. They seemed to forget that a problem so emotionally loaded would not be solved with the passing of a system but would continue to have many political overtones. The results of these errors are becoming obvious. The control programs that have resulted have not all been wise ones--many, in fact, constitute greater evils and are costing more money than the bounty systems that they replaced.

In Ontario, the question of predators and predation has been more moderately dealt with than in most areas of the continent. This is perhaps best illustrated by the fact that we have so few birds or mammals which we class as "noxious", as "vermin" or as harmful predators. The only animals that we have a long tradition of enmity against are bears and the wolves (timber wolves and coyotes). The recent legislation which established bear as a game animal indicates that wolves are now alone in the harmful animal category.

Many, or all, of you will have heard or read of the questions which are being asked: "What should we do about wolves in Ontario? Should the bountying of wolves be discontinued? What will happen if the bounty system is discontinued?" You will also have heard or read about the wolf research program which the Department of Lands and Forests instituted in 1957.

Where and how do all the pieces fit together? My principal objective in this talk is to attempt to bring together the various elements of the wolf situa-

**This paper is a revised version of a talk given at a Conservation Workshop held in Algonquin Park in 1961 and where Dr. Pimlott was a research biologist with the Research Branch. A discussion of the wolf research program has been omitted since it was included in a previous paper in Fish and Wildlife Review (Pimlott, 1961a).*

*Wolves spend much of their day in sheltered resting sites during the summer. They begin their nightly forays in the early evening.*

tion in Ontario. I will review the bounty system over the years and will attempt to show the relationship of the annual bounty kill to the present population. I will discuss some of the factors that should be considered in deciding whether or not timber wolves should be controlled on big-game ranges.

Finally, I will ask the question, "Can wolf management replace wolf control in Ontario?"

To avoid confusion between the terms wolf control and wolf management I will define them:

*Wolf Control* is the killing of wolves in an attempt to reduce population numbers or to remove specific animals that may be causing problems with game or livestock.

*Wolf Management* is a more general term. It includes the complex of things that might be undertaken to control or protect wolves, depending on the status of the wolf population and on the effect that they are having on game or livestock.

We have been paying wolf bounties in Ontario for a great many years. The early history of the system is not well known; however, B. Madigan of the Fish

and Wildlife Branch recently found records of an "Act to Encourage the Destruction of Wolves and Bears" dated 1793, while D. Omand (1950) reported that in 1859 a $6 bounty was being paid on wolves of any sex or age. At this time, the term wolves referred solely to timber wolves.

The brush wolf, or coyote, which is now included under the Wolf Bounty Act, is a recent addition to our fauna. It came to northwestern Ontario 60 to 70 years ago and to southern Ontario 40 to 50 years ago. The history of the brush wolf is discussed in more detail in the first issue of Fish and Wildlife Review (Pimlott, 1961a). Bounty payments have cost the Province a lot of money. A rough calculation indicates that, in the period from 1925 to 1962, well over 1.6 million dollars were paid out by the Provincial Government, alone (Table 1). Since 1950 the annual bill varied from a high of $56,927 in 1950 to a low of $33,619 in 1960.

"What have we received for our money? Has the kill of wolves been heavy enough to result in limiting or lowering the wolf population? What would have happened if no wolves had been killed during the period?"

Consider first the annual kill of timber wolves (Table1). Generally speaking, the kill has been between 1,000 and 1,500 animals with the occasional year when it fell slightly below or rose slightly above these limits. Cross (1937) suggested that it would require a kill of 30,000 animals a year to control the wolf population of the Province; however, I consider that he greatly overestimated the number of wolves. I believe that there are not more than 10,000 timber wolves in the Province (Pimlott, 1961b). What influence would a kill of 1,000 or 1,500 wolves a year have on a population of 10,000? On a population of 5,000? A few facts and simple calculations will help to answer the questions.

Timber wolves do not breed until they are almost two years old. In winter, the population is comprised of three distinct age classes: adults; yearlings, about to breed for their first time; and pups which are not capable of breeding for another year. An approximate estimate of the composition of the population is 50 per cent adults, 20 per cent yearlings and 30 per cent pups.

A population of 10,000 wolves, then, should contain approximately 7,000 animals (3,500 pairs) capable of breeding. With an average of five young per litter, they would produce 17,500 pups--*more than one and one-half times the number of wolves in the original population.* Similarily, a population of 5,000 could produce over 8,000 pups. Even 2,500 wolves are potentially capable of producing more than the 1,000 to 1,500 wolves that are bountied each year. It is obvious, I think, that the number of wolves killed each year could not possibly have limited or lowered the wolf population.

The second question was, "What would have happened to the wolf population if no wolves had been killed during the period from 1925 to 1960?" Recent studies have provided some light on this question and we are seeking more information in our research program in Algonquin Provincial Park.

The timber and tundra wolves of the Northwest Territories lived in a virtually unexploited state prior to the commencement of the poisoning program in 1951. A study of the carcasses of animals killed in the early stages of the program showed that there were about 20 per cent pups in the population. However, theoretical calculations, similar to those in the previous sections, indicated that they could have comprised 66 per cent of the population (Fuller and

Novakowski, 1955). The authors concluded that the difference between 20 and 66 per cent represents a surplus which does not normally survive but which is available to replace animals removed in a control program.

A very intensive timber wolf study has just been completed on Isle Royale in Lake Superior. The island, which can be seen from Port Arthur, has an area of approximately 210 square miles. It has a herd of approximately 600 moose. There were no timber wolves until about 1948 when a pack emigrated from Ontario to the island. During the past three winters, the wolves have been followed for long periods with a light aircraft. They have become so conditioned to the presence of the aircraft that they pay little attention to it. They chase and kill moose, and even carry on with normal breeding activity in full view of the observers.

The winter population of wolves for each of the past three years was between 19 and 22 animals. Rather an amazing fact when you consider that: (1) the wolves are living under complete protection; (2) they have an abundant food supply; (3) they have a breeding potential which would permit them to more than double their numbers in a year.

These and other studies strongly suggest that the answer to the question, "What would have happened to the wolf population if no wolves had been killed between 1925 and 1960?" is--virtually nothing! We would probably have about

Table 1 ONTARIO BOUNTY DATA – 1925 to 1962[1]

| Year or Period | Animals Killed[1] Wolves | Coyotes | Pups | Total | Bounty and[2] Expenses |
|---|---|---|---|---|---|
| 1925-29[3] | 1,057 | 3,088 | 57 | 4,202 | $61,045 |
| 1930-34[3] | 1,192 | 1,250 | 41 | 2,483 | 48,589 |
| 1936-39[3] | 1,075 | 1,120 | 34 | 2,229 | 32,148 |
| 1940-44[3] | 1,056 | 564 | 26 | 1,646 | 31,856 |
| 1945-49[3] | 1,423 | 929 | 48 | 2,400 | 52,634 |
| 1950 | 1,613 | 890 | 41 | 2,544 | 56,927 |
| 1951 | 1,405 | 651 | 44 | 2,100 | 46,457 |
| 1952 | 1,198 | 634 | 63 | 1,895 | 41,803 |
| 1953 | 1,313 | 739 | 68 | 2,120 | 46,550 |
| 1954 | 1,101 | 720 | 70 | 1,891 | 41,853 |
| 1955 | 1,075 | 620 | 41 | 1,736 | 38,703 |
| 1956 | 1,088 | 559 | 28 | 1,675 | 37,550 |
| 1957 | 1,195 | 486 | 71 | 1,752 | 38,950 |
| 1958 | 1,047 | 574 | 34 | 1,655 | 37,255 |
| 1959 | 1,169 | 606 | 49 | 1,824 | 41,589 |
| 1960 | 939 | 528 | 42 | 1,509 | 33,619 |
| 1961 | 1,320 | 761 | 57 | 2,138 | 48,766 |
| 1962 | 1,136 | 794 | 68 | 1,998 | 44,510 |

[1]Does not include 1935 when no separation was made between wolves and coyotes.
[2]Covers expenditures by Provincial Government, only.
[3]Figures are averages for the period. Years end on March 31st.

the same number of wolves--the average age might be a little higher.

We often fall into the error of thinking that the only criterion for the success or failure of a method of predator control (such as the bounty system or a governmental poison program) is whether or not the predator population is reduced. This is far from being the case.

The important criterion, in the case of game populations, is, "What influence is the control program having on game populations?" If we are to inaugurate predator management programs, we must realize that all aspects of wolf predation on wildlife populations are not bad. We have grown into the habit of considering that the killing of a moose or a deer by wolves is a bad thing. This is not always true, either from the standpoint of sportsmen or of the moose or deer herds.

Wolves are primarily dependent on big-game animals for their livelihood. Their entire way of life, especially their hunting behaviour, has evolved around the use of big game as their prey. They cannot persist in an area, for any extended period, where large grazing or browsing animals are absent.

Our studies in Algonquin Park show that, in this area, white-tailed deer are by far the most important item in the diet of wolves during all seasons of the year. Studies in other parts of the continent have shown a somewhat similar degree of dependence on deer, moose or some other big-game animal. However, the important question is not, "Do wolves prey on deer or moose?" but rather, "What effect does wolf predation have on the numbers of deer and moose?" and a closely related question, "When is wolf predation on deer and and moose harmful, and when is it beneficial or neutral in effect?" These are some of the questions for which we are searching for answers.

In the field of big-game research and management, great progress has been made during the past two decades. There has been a rapid increase in understanding the factors that influence the rise and fall of big-game populations. It has been shown, for example, that the rate of increase of deer and moose herds can vary markedly from area to area. The quantity and quality of the available food is usually suggested as the most important factor.

I studied moose in Newfoundland for seven years. One of the most important aspects of the work was a study of moose reproduction (Pimlott, 1959a). This work was, to a large extend, based on the study of reproductive tracts and jaw bones that were collected for us by Newfoundland hunters during the late fall and early winter hunting seasons. Two of the areas I studied were less than 100 miles apart, one in Central, the other in Eastern, Newfoundland.

The Central area had a high-density moose population and, although moose were not starving to death, they certainly had removed much of the choice browse over a large area. The Eastern area had a much lower moose population, and choice species of browse plants were more abundant. Although the moose population was much lower, we were constantly amazed by the number of

| | Central | Eastern |
|---|---|---|
| Per cent of adult cows pregnant | 74 | 87 |
| Per cent of yearling cows pregnant | 29 | 67 |
| Per cent of adult cows carrying twins | 3 | 41 |
| Average number of young per cow | 0.8 | 1.2 |

*Timber wolves are very graceful animals when on the run. In many areas, frozen lakes and streams are their principal travel routes in winter.*

moose that were killed by hunters each year. The reproduction study gave us a valuable clue to why a high kill was possible each year in the Eastern area. Look at the comparative data for the two areas.

This shows quite clearly that the numerical status of the moose herd is not simply a factor of the number that are killed by hunters or by other predators. The same basic facts have been established for white-tailed deer populations in a number of areas.

Range studies show that there is a tremendous variation in the capacity of an area to support deer or moose between the time when the forest is young and when it is 50, or more, years old. The influence of range conditions is so great that in such areas the animals can become very numerous and then virtually disappear, even though afforded complete protection from hunters and predators. The moose on Isle Royale provide an example of such as case (Aldous and Krefting, 1946). The moose reached the island from Ontario about 60 years ago. There was no hunting and no wolves. In 30 years, the moose became so numerous that much of the food supply was destroyed. Finally, large numbers died of starvation and the herd decreased to a fraction of its former size. The herd would have remained at a very low level had a large fire not occurred to give rise to large areas of young forest again.

"What is the point of this brief resume of the facts on big game?" Simply this: they illustrate that the management of deer or moose is much more than protection from overhunting or from predators, as was formerly believed. In Ontario, wolf predation, food and range conditions, snow conditions and hunting pressure influence deer and moose herds in varying degrees. One of the problems in management is to learn to recognize which factors are the important ones. When wolf predation is an important limiting factor, then the wolf population should be controlled—providing that the

big-game population is being adequately harvested by hunting.

In the following paragraphs we examine the relationships between wolves and moose, and between wolves and deer, and recognize that a single set of rules cannot be applied to each.

In large areas of Ontario where moose is the only big-game animal, they are undoubtedly the most important food of wolves. An aerial census during the winter of 1958-59 showed that there were at least 107,000 moose in areas open to hunting (Lumsden, 1959). The previous fall approximately 8,000 (seven per cent) were shot by hunters. The hunting season is a liberal one—yet hunters removed only a small percentage of the animals. Why was this the case? The inaccessibility of large areas is an important reason.

The hunting area in Sweden is less than half of that in Ontario. In 1952, hunters killed 23,000 moose, 21 per cent of an estimated population of 113,000. Since that time, the kill has continued to increase, indicating that the Swedes are not killing too many moose (Pimlott, 1959b). My studies indicate that the Newfoundland moose kill approached the intensity of the Swedish kill.

This information from Ontario, Sweden and Newfoundland shows conclusively that the Ontario moose kill could be doubled or trebled. There are many places where too few moose are being killed by hunters. In such areas, wolf predation on moose is beneficial. In these areas, wolf control is not justified.

The problem of discussing the question of wolf predation becomes more difficult when deer enter the picture. One reason is that deer have a tremendous emotional appeal to people and it is very difficult to keep sentiment from crowding out all other considerations. As someone wrote recently, "This is understandable but it's not conservation." Another reason is that our background information on deer herd is not nearly as clear-cut as it is for moose. However, it is obvious that there are a number of areas in the Province where deer exist under quite different living conditions. The variation in these situations influences considerations of wolf control. Let us examine one situation—deer in the northern part of their range. The range of white-tailed deer extends from the Gulf of Mexico to northern Canada. In Ontario, there are records of deer as far north as James Bay. However, the northern extremity of deer numerous enough to be hunted is much farther south. In the eastern half of the Province, it extends roughly through Sault Ste. Marie, Sudbury and Timagami (Passmore, 1953).

The deer herds in these northern areas are subject to very drastic declines in numbers resulting from the interaction of deep snow, low temperatures, inadequate food and predation. Many people believe that wolf predation is particularly heavy during such periods. They believe that, during severe winters, the deer are especially vulnerable and that wolves then kill many more than they actually require for food.

Our work in Algonquin Park indicates that wasteful killing may be the exception rather than the rule. During a winter of deep snow (1958-59), we followed tracks of wolf packs day after day with a helicopter. In the course of five months, we found 219 deer that had been killed by the wolves. Generally, the deer were completely eaten. Only rarely did we find evidence of more than one deer being killed at a time by a pack. Much more work of this kind is required before final conclusions are reached. Generalizations cannot be made on the basis of a single study.

*Timber wolves live primarily on big game and beaver in Ontario. The majority of the deer they kill are consumed completely by the wolf pack.*

However, this work indicates that wasteful killing is not common, even when snow is deep.

In some of these northern areas, deer and moose live in the same areas. The wolves find it much easier to kill a deer than a moose. It is possible that in such areas the deer may take the brunt of the wolf predation. "Is this the case? What happens in such areas after large numbers of deer have died during a severe winter? Does wolf predation have any appreciable effect in retarding the recovery of the deer herd after a severe decline? Would intensive wolf control be a good wildlife management measure under such circumstances?" We do not have the answers to these questions yet. However, it is obvious that considerations about wolf control are quite different than they are in the case previously considered for large areas of moose range. The relationships of wolves and deer in these northern areas warrants priority in investigative programs. Perhaps this is a case where wolves should be subjected to periodic intensive control.

"Can Wolf Management Replace Wolf Control in Ontario? Is it possible to obtain adequate public support so that the control of wolves can be placed on a 'Where needed' not a 'Where wanted' bases? Is the problem so emotional an issue that sportsmen and farmers will demand and get control programs by exerting political pressure if the bounty system is discontinued?" Essentially, it appears to me that this latter question describes what has happened in many parts of the United States and Canada.

Recently, I attempted to appraise the wolf control program which has been inaugurated in British Columbia (Pimlott, 1961b). One conclusion I reached was that public pressure had resulted in the control of wolves in many areas where such control was biologically

undesirable and economically unjustified. "Will the pressures for widespread control be as great in Ontario as in British Columbia?" I wish I knew the answers to all these questions. I do believe that there is a better chance for a predator management program in Ontario than in any other area of Canada. However, the important question needs to be repeated, "Can wolf management be achieved?"

Simply changing from the bounty system to some other system of control is not going to make wolf control synonymous with wildlife management. We should not delude ourselves. If we undertake Province-wide control of wolves, or if areas where wolf control is to be conducted are to be decided by political pressure, then a change of systems will be of little value. We will still be in the jungle wasting our time and our money, both of which we should be using on productive aspects of our management programs.

Wolf management must use a many-sided approach. It must consider the positive as well as the negative side of these big predators. It must use protection and control as the twin facets of its approach. It should seek to develop the sporting possibilities of wolf hunting and it should establish the place of the wolves as permanent members of our fauna.

"What do you think? Is wolf management a practical possibility or is it an impractical day dream?"

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*Early morning on Lake Mazinaw, Tweed Forest District. (Photos by T. Jenkins).*
*Back Cover: Angling at Burleigh Falls, Lindsay Forest District.*